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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,750	02/23/2004	Frank Dimeo JR.	2771-546 CIP 2	2238

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INTELLECTUAL PROPERTY / TECHNOLOGY LAW
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EXAMINER	
SAINT SURIN, JACQUES M	

ART UNIT	PAPER NUMBER
2856	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/784,750	DIMEO ET AL.	
	Examiner	Art Unit	
	Jacques M. Saint-Surin	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02/23/04, 09/07/04, 09/04/04, 07/08/05,*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21, 25-39 and 41-46* is/are rejected.

7)☒ Claim(s) *22-24 and 40* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-21, 25-39 and 41-46 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen (US Patent 7,228,724).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claim 1, Chen discloses a gas sensor assembly comprising a gas-sensing filament comprising nickel or nickel alloy, and means for detecting a change in at least one property of said gas-sensing filament upon contact with a target gas species and responsively generating an output signal indicative of presence of said target gas species (col. 3, lines 37-46).

Regarding claim 2, Chen discloses the gas sensor assembly of claim 1, wherein the target gas species comprises a fluoro species selected from the group consisting of NF.sub.3, SiF.sub.4, C.sub.2F.sub.6, HF, F.sub.2, COF.sub.2, ClF.sub.3, IF.sub.3, and activated species thereof (col. 12, lines 61-64).

Regarding claim 3, Chen discloses the gas sensor assembly of claim 1, wherein said gas-sensing filament is characterized by an average diameter of less than about 500 microns (col. 11, lines 18-20).

Regarding claim 4, Chen discloses the gas sensor assembly of claim 1, wherein said gas-sensing filament is characterized by an average diameter of less than about 150 microns (col. 11, lines 21-23).

Regarding claim 5, Chen disclose the gas sensor assembly of claim 1, wherein said gas-sensing filament is characterized by an average diameter of less than about 50 microns (col. 11, lines 24-26).

Regarding claim 6, Chen discloses the gas sensor assembly of claim 1, wherein said gas-sensing filament is characterized by an average diameter in a range of from about 0.1 micron to about 30 microns (col. 11, lines 27-30).

Regarding claims 7-8, Chen discloses the gas sensor assembly of claim 1, wherein said gas-sensing filament is characterized by a length of more than about 1 cm. and wherein said gas-sensing filament is characterized by a length of more than about 5 cm (col. 11, lines 34-36).

Regarding claim 9, Chen discloses the gas sensor assembly of claim 1, wherein said gas-sensing filament is characterized by a length of more than 10 cm (col. 11, lines 34-36).

Regarding claim 10, Chen discloses the gas sensor assembly of claim 1, wherein said gas-sensing filament comprises a coating structure encapsulating a core structure, wherein said coating structure comprises nickel or nickel alloy, and wherein said core structure has an electrical resistivity that is higher than that of the coating structure and a heat capacity that is lower than that of the coating structure (col. 11, lines 43-48).

Regarding claim 11, Chen discloses the gas sensor assembly of claim 10, wherein the electrical resistivity of the core structure is at least about fifty times higher than that of the coating structure, and wherein the heat capacity of said core structure is less than three fourth of that of the coating structure (col. 11, lines 43-48).

Regarding claim 12, Chen discloses the gas sensor assembly of claim 10, wherein the electrical resistivity of the core structure is at least about a thousand times higher than that of the coating structure, and wherein the heat capacity of said core structure is less than one half of that of the coating structure (col. 11, lines 48-53).

Regarding claim 13, Chen discloses the gas sensor assembly of claim 10, wherein the electrical resistivity of the core structure is at least about 10 m.andgate..multidot.cm, and wherein the heat capacity of said core structure is less than 2.5 J/K.multidot.cm.sup.3 (col. 11, lines60-63).

Regarding claim 14, Chen discloses the gas sensor assembly of claim 10, wherein said core structure comprises a nickel-copper alloy, and wherein said coating structure consists essentially of nickel (col. 11, lines 64-66).

Regarding claim 15, Chen discloses the gas sensor assembly of claim 10, wherein said core structure comprises silicon carbide (col. 12, lines 1-2).

Regarding claim 16, Chen discloses the gas sensor assembly of claim 10, wherein said core structure comprises a composite fiber having multiple layers of different materials (col. 12, lines 3-5).

Regarding claim 17, Chen discloses thee gas sensor assembly of claim 10, wherein said core structure comprises a composite fiber having a carbon core fiber coated with a silicon carbide layer (col. 12, lines 6-9).

Regarding claim 18, Chen discloses the gas sensor assembly of claim 1, wherein the gas-sensing filament is electrochemically thinned after fabrication of said gas sensor assembly and is characterized by an average diameter of not more than 50 microns (col. 9, lines 17-20).

Regarding claim 19, Chen discloses the gas sensor assembly of claim 18, wherein the gas-sensing filament is characterized by an average diameter of not more than 25 microns. (col. 13, lines 11-14).

Regarding claim 20, Chen discloses the gas sensor assembly of claim 18, wherein the gas-sensing filament is characterized by an average diameter of not more than 10 microns (col. 13, lines 15-18).

Regarding claim 21, Chen discloses the gas sensor assembly of claim 18, wherein the gas-sensing filament is characterized by an average diameter in a range of from about 0.1 micron to about 5 microns (col. 13, lines 19-22).

Regarding claim 24, Chen discloses the gas sensor assembly of claim 23, wherein said nickel-copper alloy further comprises one or more metals selected from the group consisting of Ti, V, Cr, Mn, Nb, Mo, Ru, Pd, Ag, Ir, and Pt (col. 12, lines 40-43).

Regarding claim 25, Chen discloses the gas sensor assembly of claim 1, wherein said gas-sensing filament comprises a porous coating of nickel or nickel alloy (col. 12, lines 33-35).

Regarding claim 26, Chen discloses the gas sensor assembly of claim 25, wherein said porous coating is characterized by open pore structures (col. 12, lines 47-49).

Regarding claim 27, Chen discloses the gas sensor assembly of claim 1, further comprising a support structure for suspending said gas-sensing filament (col. 12, lines 50-54).

Regarding claim 28, Chen discloses the gas sensor assembly of claim 27, wherein said support structure comprises a material that is resistant to said target gas species (col. 12, lines 65-67).

Regarding claim 29, Chen discloses the gas sensor assembly of claim 27, wherein the target gas species comprises a fluoro species selected from the group

consisting of NF.sub.3, SiF.sub.4, C.sub.2F.sub.6, HF, F.sub.2, COF.sub.2, ClF.sub.3, IF.sub.3, and activated species thereof, and wherein the support structure comprises a material selected from the group consisting of polyimide, aluminum, or nickel (col. 12, lines 61-64).

Regarding claim 30, Chen discloses a method for monitoring a fluid locus for the presence of a target gas species therein, said method comprising: exposing fluid at said fluid locus to a gas-sensing assembly as in claim 1; monitoring at least one property of the gas-sensing filament of such gas-sensing assembly; and responsively generating an output signal when the gas-sensing filament exhibits a change in the at least one property thereof, indicating the presence of the target gas species in the fluid locus, or a change in concentration of the target gas species in the fluid locus (col. 13, lines23-33).

Regarding claim 31, Chen discloses the method of claim 30, wherein said at least one property of the gas-sensing filament being monitored is the electrical resistance thereof (col. 14, lines 1-3).

Regarding claim 32, Chen discloses a gas sensor assembly comprising a gas-sensing filament comprising a coating structure encapsulating a core structure, wherein said coating structure comprises a gas-sensitive material that exhibit a detectable change upon contact with a target gas species, and wherein said core structure is characterized by an electrical resistivity that is higher than that of the coating structure and a heat capacity that is lower than that of the coating structure (see: col. 2, lines 49-67 and col. 7, lines 51-58).

Regarding claim 33, Chen discloses a gas sensor assembly comprising a gas-sensing filament comprising a coating structure and a core structure, wherein said coating structure comprises nickel or nickel alloy, and wherein said core structure comprises silicon carbide (col. 2, lines 57-65, Fig. 6 and col. 8, lines 24-28).

Regarding claim 34, Chen discloses a gas sensor assembly comprising a gas-sensing filament comprising a coating structure and a core structure, wherein said coating structure comprises nickel or nickel alloy, and wherein said core structure comprises a carbon center and a sheath of silicon carbide (col. 8, lines 24-45).

Regarding claim 35, Chen discloses a gas sensor assembly comprising an electrochemically-thinned gas-sensing filament comprising nickel or nickel filament, wherein said filament is characterized by an average diameter of not more than 50 microns (col. 9, lines 17-20).

Regarding claim 36, Chen discloses a method for forming the gas sensor assembly of claim 35, comprising the steps of: (a) providing a gas sensor assembly precursor comprising a gas-sensing filament comprising nickel or nickel filament, wherein said filament has an average diameter of more than 50 microns; (b) electrochemically thinning said gas-sensing filament for a sufficient period of time, so as to reduce the average diameter thereof to not more than 50 microns (col. 9, lines 25-36).

Regarding claim 37, Chen discloses a method for forming a gas sensor assembly, comprising the steps of: (a) providing a gas sensor assembly precursor comprising a gas-sensing filament comprising nickel or nickel filament; (b)

electrochemically thinning said gas-sensing filament for a sufficient period of time, so as to reduce the average diameter thereof (col. 9, lines 17-36).

Regarding claim 38, Chen discloses a gas sensor assembly comprising a gas-sensing filament comprising a nickel-copper alloy (see: Fig. 9 and col. 47-52).

Regarding calim 39, Chen discloses a gas sensor assembly comprising a gas-sensing filament comprising a nickel-copper-aluminum alloy (col. 9, lines 47-60).

Regarding claim 41, Chen discloses a gas sensor assembly comprising a nickel-containing gas-sensing filament having a porous surface (col. 9, lines 42-43).

Regarding claim 42, Chen discloses the gas sensor assembly of claim 41, wherein said porous surface is characterized by open pore structures (col. 9, lines 62-66).

Regarding claim 43, Chen discloses a gas sensor assembly comprising a support structure for suspending a free-standing nickel-containing gas-sensing filament (col. 2, lines 63-65).

Regarding claim 44, Chen discloses the gas sensor assembly of claim 43, wherein said support structure comprises a material that is resistant to fluoro species (col. 10, lines 45-55).

Regarding claim 45, Chen discloses the gas sensor assembly of claim 43, wherein said support structure comprises a material selected from the group consisting of polyimide, aluminum, and nickel (col. 3, lines 38-42).

Regarding claim 46, Chen discloses a gas sensor assembly arranged in sensing relationship to a process chamber that is susceptible to presence of one or more target

fluoro species, wherein said gas sensor assembly comprises a gas-sensing filament containing nickel or nickel-alloy, as mounted on a fluoro-resistant support structure and coupled to means for detecting a change in at least one property of said gas-sensing filament upon contact with the target fluoro species and responsively generating an output signal indicative of the presence of said target fluoro species (col. 3, lines 34-47).

3. Claims 33-35, 38-39 and 43 are rejected under 35 U.S.C. 102(b) as being anticipated by Takami et al. (US Patent 4,415,877).

Regarding claims 33-34, Takami discloses a gas sensor assembly (col. 1, lines 46-52) comprising a gas-sensing filament (1) comprising a coating structure (2b) and a core structure, wherein said coating structure comprises nickel or nickel alloy, and wherein said core structure comprises silicon carbide (see: col. 2, lines 60-64). Regarding claim 34, Takami further discloses it can be estimated that the electrode breakage was due to the accumulation of carbon, in both cases. The electrode indicated by specimen numbers 21 through 27 whose cover layers were formed with alloy containing less than 1% low catalytic metal by weight, deposited carbon in 100 hours which might result in the semiconductor cracks (see: col. 3, lines 67-68 and col. 4, lines 1-10, see also: col. 5, lines 10-22).

Regarding claims 35-37, Takami discloses a gas sensor assembly comprising an electrochemically-thinned gas-sensing filament (1, see: col. 1, lines 46-51) comprising nickel or nickel filament (col. 1, lines 63-64), wherein said filament is characterized by an average diameter of not more than 50 microns (each electrode 2 was prepared by

forming a cover layer 2b of 50.mu. in thickness by cladding an alloy containing essentially platinum metal and low catalytic metal, on the surface of a nickel wire 2a of 0.35 mm diameter, see: col. 2, lines 58-68).

Regarding claims 38 and 39, Takami discloses a gas sensor assembly comprising a gas sensing element comprising a nickel-copper alloy (see: col. 5, lines 11-16 and col. 6, lines 11-14).

Regarding claims 41-42, Takami discloses the semiconductor made of the sintered oxide (hereinafter referred to as "an oxide semiconductor") is made porous to increase the gas sensing ability. Therefore, CO and HC in the exhaust gas enter the porous semiconductor and come in contact with the platinum metal electrodes, and carbon is deposited by their catalytic reaction (col. 1, lines 30-36).

4. Claim 43 is rejected under 35 U.S.C. 102(b) as being anticipated by William (US Patent 2,194,520).

Regarding claim 43, William discloses a gas sensor assembly comprising a support structure (supporting frame 1 and filament 6, see col. 1, lines 28-30, 34-36) also col. 2, lines 59-62).

5. Claims 22-24 and 40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques M. Saint-Surin whose telephone number is

(571) 272-2206. The examiner can normally be reached on Mondays to Fridays between 10:30 A.M and 800 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jacques M. Saint-Surin
September 30, 2007

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